OUTLINES OF LEARNING PROGRAM
LEARNING PLAN UNITS
COURSE CONTRACT

Object Oriented Programming
(PAC 113)

STUDY PROGRAM OF COMPUTER SCIENCE
DEPARTMENT OF MATHEMATICS - FACULTY OF MIPA
DIPONEGORO UNIVERSITY

OUTLINES OF LEARNING PROGRAM (GBPP)

Course Subject : Object Oriented Programming (OOP)
Course ID : PAC 113
Credits : 3

A. Course Description

OOP is a programming paradigm in system development characterized by: 1) system components encapsulated into objects consisting groups of data and functions, 2) using inheritance for system components reusability, and 3) using message passing concept in communication among objects.

B. General Instructional Objectives

Students understand OOP concept and are capable to implement the concept in an object-oriented application development effectively and efficiently.

C. Learning Plan Units

No.	Specific Instructional Objectives	Topics	Subtopics	Time Estimation
1.	Students are able to explain Basic Consept of Object Oriented Programming correctly about 90%	Basic Concept of Object Oriented Programming	1. Object 2. Data Encapsulation 3. Message Passing 4. OO System 5. Class 6. Class Relationships 7. Object Lifecycle 8. Object Manipulation	3 x 3 x 50 minutes
2.	Students are able to implement data structure in context of object	Object Oriented Data Structure	1. Stack 2. Queue 3. List 4. Tree	2 x 3 x 50 minutes
3.	Students are able to explain inheritance correctly about 90%	Inheritance	1. Inheritance 2. Purposes of inheritance 3. Single Inheritance 4. Multiple Inheritance 5. Rename 6. Redefine 7. Undefine 8. Select	2 x 3 x 50 minutes
4.	Learning process evaluation	Mid Semester Test (UTS)		2 x 50 minutes
5.	Students are able to explain Polymorphism correctly about 90%	Polymorphism	1. Polymorphism 2. Polymorphism classification	3 x 50 minutes

No.	Specific Instructional Objectives	Topics	Subtopics	Time Estimation
6.	Students are able to implement Assertion and Exception	Assertion and Exception	1. Assertion 2. Assertion Purpose 3. Exception 4. Exception Purpose	3 x 50 minutes
7.	Students are able to explain Specific Concept Related to Language correctly about 90%	Specific Concepts Related to Languages	1. Abstract Class 2. Generic Class 3. Root Class 4. Final Class 5. Concurrency 6. Interface 7. Package 8. Inline Function 9. Anchored Declaration	2 x 3 x 50 minutes
8.	Students are able to implement Object Oriented Application	Object Oriented Application	1. Visual Programming 2. Database management 3. Case Study 4. Application Design 5. Design Realization 6. Solution Testing 7. Application Development Evaluation	3 x 3 x 50 minutes
9.	Learning process evaluation	Final Test (UAS)		2 x 50 minutes
			Total	2300 minutes

LEARNING PLAN UNITS (SAP)

Couse Subject : Object Oriented Programming
Couse ID : PAC113
Credits : 3
Time Estimation : 3 x 50 minutes
Arrangement : I,II,III

A. Instuctional Object :

1. General : Students understand OOP concept and are capable to implement the concept in an object-oriented application development effectively and efficiently.

2. Specific : Students are able to explain Basic Concept of Object Oriented Programming correctly about 90%

B. Topic : Basic Concept of Object Oriented Programming

C. Subtopic :
1. Object
2. Data Encapsulation
3. Message Passing
4. OO System
5. Class
6. Class Relationships
7. Object Lifecycle
8. Object Manipulation

D. Learning Activities and Learning Tools and Media

Phases	Lecturer Activities	Students Activities	Learning Tools and Media
1	2	3	4
Initiation	1. To explain scope of conduction I. 2. To explain purposes of Basic Concept of Object Oriented Programming. 3. To explain competencies in TIU and TIK arrangement I.	• To pay attention. • To pay attention. • To pay attention.	• OHP/LCDP • OHP/LCDP • OHP/LCDP
Presentation	4. To explain Object as enitites in program. 5. To explain concepts and purposes of data encapsulation	• To pay attention, and take a notice. • To pay attention,	• OHP/LCDP, whiteboard. • OHP/LCDP,

Phases	Lecturer Activities	Students Activities	Learning Tools and Media
1	2	3	4
	6. To explain concepts and purposes of message passing 7. To explain concepts and purposes of OO system 8. To explain Class as static concepts of object 9. To explain characteristics and pusposes class relationship	and take a notice. • To pay attention, and take a notice. • To pay attention, and take a notice. • To pay attention, and take a notice. • To pay attention, and take a notice.	whiteboard. • OHP/LCDP, whiteboard. • OHP/LCDP, whiteboard. • OHP/LCDP, whiteboard. • OHP/LCDP, whiteboard.
Termination	10. Close the arrangement: a. To raise questions to students and conduct discussion b. To review materials that of students have not understood. c. To conlude materials and bring correlation up to next arrangement.	• To review the material, to attend discussion.	• OHP, whiteboard.

E. Evaluation

1. To give assignment to students to define simple real life class/object.
2. Assignment evaluation in next arangement.

F. References

1. Bertrand Meyer: **Object-Oriented Software Construction**, Second Edition. Prentice Hall, 1997.
2. Inggriani Liem: **Diktat Kuliah IF322 Pemrograman Berorientasi Objek**. Informatika ITB, 2001.
3. A.C. Kak: **Programming with Objects: A Comparative Presentation of Object-Oriented Programming with C++ and Java**. John Wiley & Sons, 2003.
4. Sun Microsystems Inc.: http://java.sun.com/docs/books/tutorial/java/concepts/, 2006.

LEARNING PLAN UNITS (SAP)

Couse Subject : Object Oriented Programming
Couse ID : PAC113
Credits : 3
Time Estimation : 3 x 50 minutes
Arrangement : IV,V

A. Instuctional Object :

1. General : Students understand OOP concept and are capable to implement the concept in an object-oriented application development effectively and efficiently.

2. Specific : Students are able to implement data structure in context of object

B. Topic : Object Oriented Data Structure

C. Subtopic :
1. Stack
2. Queue
3. List
4. Tree

D. Learning Activities and Learning Tools and Media

Phases	Lecturer Activities	Students Activities	Learning Tools and Media
1	2	3	4
Initiation	1. To explain scope of conduction IV,V. 2. To explain purposes of Object Oriented Data Structure. 3. To explain competencies in TIU and TIK arrangement IV,V.	• To pay attention. • To pay attention. • To pay attention.	• OHP/LCDP • OHP/LCDP • OHP/LCDP
Presentation	4. To explain concept of Stack 5. To explain concept of Queue 6. To explain concept of List	• To pay attention, and take a notice, to program. • To pay attention, and take a notice, to program. • To pay attention, and take a notice, to	• OHP/LCDP, whiteboard. • OHP/LCDP, whiteboard. • OHP/LCDP, whiteboard.

Phases	Lecturer Activities	Students Activities	Learning Tools and Media
1	2	3	4
	7. To explain concept of Tree	program. • To pay attention, and take a notice, to program.	• OHP/LCDP, whiteboard.
Termination	8. Close the arrangement: a. To raise questions to students and conduct discussion b. To review materials that of students have not understood. c. To conlude materials and bring correlation up to next arrangement.	• To review the material, to attend discussion.	• OHP, whiteboard.

E. Evaluasi

1. To give assignment to students to define simple real life class/object.
2. Assignment evaluation in next arangement.

F. Referensi

1. Bertrand Meyer: **Object-Oriented Software Construction**, Second Edition. Prentice Hall, 1997.
2. Inggriani Liem: **Diktat Kuliah IF322 Pemrograman Berorientasi Objek**. Informatika ITB, 2001.
3. A.C. Kak: **Programming with Objects: A Comparative Presentation of Object-Oriented Programming with C++ and Java**. John Wiley & Sons, 2003.
4. Sun Microsystems Inc.: http://java.sun.com/docs/books/tutorial/java/concepts/ ,2006.

LEARNING PLAN UNITS (SAP)

Couse Subject : Object Oriented Programming
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Credits : 3
Time Estimation : 3 x 50 minutes
Arrangement : VI,VII

A. Instuctional Object :

1. General : Students understand OOP concept and are capable to implement the concept in an object-oriented application development effectively and efficiently.

2. Specific : Students are able to explain inheritance correctly about 90%

B. Topic : Inheritance

C. Subtopic :
1. Inheritance
2. Purposes of inheritance
3. Single Inheritance
4. Multiple Inheritance
5. Rename
6. Redefine
7. Undefine
8. Select

D. Learning Activities and Learning Tools and Media

Phases	Lecturer Activities	Students Activities	Learning Tools and Media
1	2	3	4
Initiation	1. To explain scope of conduction VI,VII. 2. To explain purposes of Inheritance. 3. To explain competencies in TIU and TIK arrangement VI,VII.	• To pay attention. • To pay attention. • To pay attention.	• OHP/LCDP • OHP/LCDP • OHP/LCDP
Presentation	4. To explain concepts and purposes of Inheritance. 5. To explain inheritance mechanism in class design	• To pay attention, and take a notice. • To pay attention, and take a notice.	• OHP/LCDP, whiteboard. • OHP/LCDP, whiteboard

Phases	Lecturer Activities	Students Activities	Learning Tools and Media
1	2	3	4
	6. To explain concepts and implementation of single inheritance 7. To explain concepts and implementation of multiple inheritance 8. To explain concepts and mechanism of Rename	• To pay attention, and take a notice. • To pay attention, and take a notice. • To pay attention, and take a notice.	• OHP/LCDP, whiteboard. • OHP/LCDP, whiteboard. • OHP/LCDP, whiteboard.
	9. To explain concepts and mechanism of Redefine 10. To explain concepts and mechanism of Undefine 11. To explain concepts and mechanism of Select	• To pay attention, and take a notice. • To pay attention, and take a notice • To pay attention, and take a notice.	• OHP/LCDP, whiteboard. • OHP/LCDP, whiteboard. • OHP/LCDP, whiteboard.
Termination	12. Close the arrangement: a. To raise questions to students and conduct discussion b. To review materials that of students have not understood. c. To conlude materials and bring correlation up to next arrangement.	• To review the material, to attend discussion.	• OHP, whiteboard.

E. Evaluasi

1. To give assignment to implement inheritance within a program.
2. Assignment evaluation in next arangement.

F. Referensi

1. Bertrand Meyer: **Object-Oriented Software Construction**, Second Edition. Prentice Hall, 1997.
2. Inggriani Liem: **Diktat Kuliah IF322 Pemrograman Berorientasi Objek**. Informatika ITB, 2001.
3. A.C. Kak: **Programming with Objects: A Comparative Presentation of Object-Oriented Programming with C++ and Java**. John Wiley & Sons, 2003.
4. Sun Microsystems Inc.: http://java.sun.com/docs/books/tutorial/java/concepts/ ,2006.

LEARNING PLAN UNITS (SAP)

Couse Subject : Object Oriented Programming
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Credits : 3
Time Estimation : 3 x 50 minutes
Arrangement : IX

A. Instuctional Object :
1. General : Students understand OOP concept and are capable to implement the concept in an object-oriented application development effectively and efficiently.

2. Specific : Students are able to explain Polymorphism correctly about 90%

B. Topic : Polymorphism

C. Subtopic :
1. Polymorphism
2. Polymorphism classification

D. Learning Activities and Learning Tools and Media

Phases	Lecturer Activities	Students Activities	Learning Tools and Media
1	2	3	4
Initiation	1. To explain scope of conduction IX. 2. To explain purposes of Polymorphism. 3. To explain competencies in TIU and TIK arrangement IX.	• To pay attention. • To pay attention. • To pay attention.	• OHP/LCDP • OHP/LCDP • OHP/LCDP
Penyajian	3. To explain concepts and purposes of Polymorphism. 4. To explain Polymorphism classification	• To pay attention, and take a notice. • To pay attention, and take a notice, to program.	• OHP/LCDP, whiteboard. • OHP/LCDP, whiteboard.
Termination	5. Close the arrangement: a. To raise questions to students and conduct discussion b. To review materials that of students have not understood. c. To conlude and bring correlation up to next arrangement.	• To review the material, to attend discussion.	• OHP, whiteboard.

E. Evaluation

1. To gice assignment to implement polymorphism in a program.
2. Assignment evaluation in next arangement.

F. References

1. Bertrand Meyer: **Object-Oriented Software Construction**, Second Edition. Prentice Hall, 1997.
2. Inggriani Liem: **Diktat Kuliah IF322 Pemrograman Berorientasi Objek**. Informatika ITB, 2001.
3. A.C. Kak: **Programming with Objects: A Comparative Presentation of Object-Oriented Programming with C++ and Java**. John Wiley & Sons, 2003.
4. Sun Microsystems Inc.: http://java.sun.com/docs/books/tutorial/java/concepts/ ,2006.

LEARNING PLAN UNITS (SAP)

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Credits : 3
Time Estimation : 3 x 50 minutes
Arrangement : X

A. Instuctional Object :

1. General : Students understand OOP concept and are capable to implement the concept in an object-oriented application development effectively and efficiently.

2. Specific : Students are able to implement Assertion and Exception

B. Topic : Assertion and Exception

C. Subtopic :
1. Assertion
2. Assertion Purpose
3. Exception
4. Exception Purpose

D. Learning Activities and Learning Tools and Media

Phases	Lecturer Activities	Students Activities	Learning Tools and Media
1	2	3	4
Initiation	1. To explain scope of conduction X. 2. To explain purposes of Assertion and Exception. 3. To explain competencies in TIU and TIK arrangement X.	• To pay attention. • To pay attention. • To pay attention.	• OHP/LCDP • OHP/LCDP • OHP/LCDP
Presentation	4. To explain assertion concepts. 5. To explain pueposes and implementation of assertion 6. To explain Exception concepts. 7. To explain pueposes and implementation of Exception	• To pay attention, and take a notice • To pay attention, and take a notice, to program. • To pay attention, and take a notice • To pay attention,	• OHP/LCDP, whiteboard. • OHP/LCDP, whiteboard. • OHP/LCDP, whiteboard. • OHP/LCDP,

Phases	Lecturer Activities	Students Activities	Learning Tools and Media
1	2	3	4
		and take a notice, to program.	whiteboard.
Termination	8. Close the arrangement: a. To raise questions to students and conduct discussion b. To review materials that of students have not understood. c. To conlude materials and bring correlation up to next arrangement.	• To review the material, to attend discussion.	• OHP, whiteboard.

E. Evalution

1. To give assignment to implement assrtion and exception in program.
2. Assignment evaluation in next arangement.

F. References

1. Bertrand Meyer: **Object-Oriented Software Construction**, Second Edition. Prentice Hall, 1997.
2. Inggriani Liem: **Diktat Kuliah IF322 Pemrograman Berorientasi Objek**. Informatika ITB, 2001.
3. A.C. Kak: **Programming with Objects: A Comparative Presentation of Object-Oriented Programming with C++ and Java**. John Wiley & Sons, 2003.
4. Sun Microsystems Inc.: http://java.sun.com/docs/books/tutorial/java/concepts/ ,2006.

LEARNING PLAN UNITS (SAP)

Couse Subject : Object Oriented Programming
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Credits : 3
Time Estimation : 3 x 50 minutes
Arrangement : XI,XII

A. Instuctional Object :

1. General : Students understand OOP concept and are capable to implement the concept in an object-oriented application development effectively and efficiently.

2. Specific : Students are able to explain Specific Concept Related to Language correctly about 90%

B. Topic : Specific Concepts Related to Languages

C. Subtopic :
1. Abstract Class
2. Generic Class
3. Root Class
4. Final Class
5. Concurrency
6. Interface
7. Package
8. Inline Function
9. Anchored Declaration

D. Learning Activities and Learning Tools and Media

Phases	Lecturer Activities	Students Activities	Learning Tools and Media
1	2	3	4
Initiation	1. To explain scope of conduction XI,XII. 2. To explain purposes of Specific Concepts Related to Languages. 3. To explain competencies in TIU and TIK arrangement XI,XII.	• To pay attention. • To pay attention. • To pay attention.	• OHP/LCDP • OHP/LCDP • OHP/LCDP
Presentation	1. To explain concepts of Abstract Class	• To pay attention, and take a notice.	• OHP/LCDP, whiteboard.

Phases	Lecturer Activities	Students Activities	Learning Tools and Media
1	2	3	4
	2. To explain concepts of Generic Class 3. To explain concepts of Root Class 4. To explain concepts of Final Class	• To pay attention, and take a notice. • To pay attention, and take a notice. • To pay attention, and take a notice.	• OHP/LCDP, whiteboard. • OHP/LCDP, whiteboard. • OHP/LCDP, whiteboard.
	5. To explain concepts of Concurrency 6. To explain concepts of Interface 7. To explain concepts of Package 8. To explain concepts of Inline Function 9. To explain concepts of Anchored Declaration	• To pay attention, and take a notice. • To pay attention, and take a notice. • To pay attention, and take a notice. • To pay attention, and take a notice. • To pay attention, and take a notice.	• OHP/LCDP, whiteboard. • OHP/LCDP, whiteboard. • OHP/LCDP, whiteboard. • OHP/LCDP, whiteboard. • OHP/LCDP, whiteboard.
Termination	4. Close the arrangement: a. To raise questions to students and conduct discussion b. To review materials that of students have not understood. c. To conlude materials and bring correlation up to next arrangement.	• To review the material, to attend discussion.	• OHP, whiteboard.

E. Evaluation

1. To give assignment to implement abstract class, interface and package in program.
2. Assignment evaluation in next arangement.

F. References

1. Bertrand Meyer: **Object-Oriented Software Construction**, Second Edition. Prentice Hall, 1997.
2. Inggriani Liem: **Diktat Kuliah IF322 Pemrograman Berorientasi Objek**. Informatika ITB, 2001.
3. A.C. Kak: **Programming with Objects: A Comparative Presentation of Object-Oriented Programming with C++ and Java**. John Wiley & Sons, 2003.
4. Sun Microsystems Inc.: http://java.sun.com/docs/books/tutorial/java/concepts/ ,2006.

LEARNING PLAN UNITS (SAP)

Couse Subject : Object Oriented Programming
Couse ID : PAC113
Credits : 3
Time Estimation : 3 x 50 minutes
Arrangement : XIII,XIV,XV

A. Instuctional Object :

1. General : Students understand OOP concept and are capable to implement the concept in an object-oriented application development effectively and efficiently.

2. Specific : Students are able to implement Object Oriented Application

B. Topic : Object Oriented Application

C. Subtopic :
1. Visual Programming
2. Database management
3. Case Study
4. Application Design
5. Design Realization
6. Solution Testing
7. Application Development Evaluation

D. Learning Activities and Learning Tools and Media

Phases	Lecturer Activities	Students Activities	Learning Tools and Media
1	2	3	4
Initiation	1. To explain scope of conduction XIII,XIV,XV. 2. To explain purposes of Object Oriented Application 3. To explain competencies in TIU and TIK arrangement XIII,XIV,XV.	• To pay attention. • To pay attention • To pay attention.	• OHP/LCDP • OHP/LCDP • OHP/LCDP
Presentation	4. To explain concepts of Visual Programming 5. To explain concepts of Database management	• To pay attention, and take a notice • To pay attention, and take a notice, to	• OHP/LCDP, whiteboard. • OHP/LCDP, whiteboard.

Phases	Lecturer Activities	Students Activities	Learning Tools and Media
1	2	3	4
	6. To offer Case Studies 7. To explain concepts of Application Design 8. To explain concepts of Design Realization 9. To explain concepts of Solution Testing 10. To evaluate Application Development	program • To pay attention, and take a notice • Memperhatikan, mencatat, analyze . • To pay attention, and take a notice, to program. • To pay attention, and take a notice, test program. • Memperhatikan, mencatat.	• OHP/LCDP, whiteboard. • OHP/LCDP, whiteboard. • OHP/LCDP, whiteboard. • OHP/LCDP, whiteboard. • OHP/LCDP, whiteboard.
Termination	11. Close the arrangement: a. To raise questions to students and conduct discussion b. To review materials that of students have not understood. c. To conlude materials and bring correlation up to next arrangement.	• To review the material, to attend discussion.	• OHP, whiteboard.

E. Evaluation

1. To assign students to develop data base visual program.
2. Assignment evaluation in next arangement.

F. References

1. Bertrand Meyer: **Object-Oriented Software Construction**, Second Edition. Prentice Hall, 1997.
2. Inggriani Liem: **Diktat Kuliah IF322 Pemrograman Berorientasi Objek**. Informatika ITB, 2001.
3. A.C. Kak: **Programming with Objects: A Comparative Presentation of Object-Oriented Programming with C++ and Java**. John Wiley & Sons, 2003.
4. Sun Microsystems Inc.: http://java.sun.com/docs/books/tutorial/java/concepts/ ,2006.